IN THE CLAIMS:

1. (Currently Amended) A computer-readable medium having stored thereon a plurality of instructions including instructions that when executed by a processor cause the processor to implement a system for provisioning QoS paths with restoration in a network, comprising:

a primary path generator configured to identify a ~~suitable~~ primary QoS path for normal network operation between source and destination nodes in a network;

an auxiliary graph generator, associated with said primary path generator, configured to construct a directed auxiliary graph from an undirected graph representing said network by reversing each link in said ~~a~~ primary QoS path of said undirected graph and replacing each other link in said undirected graph that is not a link in said primary QoS path by two directed links;

a walk identifier, associated with said auxiliary graph generator, configured to identify a walk in said auxiliary directed graph including ~~corresponding to a set of~~ bridges in said network; and

a bridge identifier, associated with said walk identifier, configured to decompose said walk into ~~identify~~ a set of bridges in said network such that each ~~at least one~~ link of said primary QoS path is protected by a bridge of said set of bridges and each bridge of said set of bridges protects a different portion of said primary QoS path, wherein a restoration path between said source and said destination includes a bridge from said set of bridges and links of said primary QoS path, both of said restoration path and said primary QoS path satisfying QoS constraints.

2. (Original) The system as recited in Claim 1 wherein said auxiliary graph generator is further configured to assign a zero cost to said each link and said walk identifier is configured to reduce a cost of said walk.

3. (Original) The system as recited in Claim 1 wherein said walk identifier is configured

to satisfy a delay constraint and apply a modified restricted shortest path algorithm to identify said walk.

4. (Original) The system as recited in Claim 1 wherein said walk identifier is configured to identify multiple walks in said auxiliary directed graph, said multiple walks representing multiple restoration paths.

5. (Currently Amended) The system as recited in Claim 1 wherein said QoS constraints include both a bandwidth constraint and a delay constraint ~~primary graph generator further determines said primary QoS path~~.

6. (Currently Amended) The system as recited in Claim 1 wherein one of said QoS constraints is a delay constraint and a delay of a bridge of said set of bridges is no greater than a total delay of said primary QoS path subtracted from a sum of said delay constraint and a delay of a link of said primary QoS path protected by said bridge ~~said walk identifier decomposes said walk to a set of bridges~~.

7. (Currently Amended) The system as recited in Claim 1 wherein an adjusted delay is applied to said walk to determine if said walk represents a feasible restoration topology, wherein a value of an adjusted delay of a walk terminating at a node u_k in said network is based on if node u_{k-1} is a node of said primary QoS path ~~said system is associated with a network operations center of said network~~.

8. (Currently Amended) A method of provisioning QoS paths with restoration in a network, comprising:

identifying a ~~suitable~~ primary QoS path for normal network operation between source and destination nodes in a network, said primary QoS path satisfying both a bandwidth constraint and a

delay constraint;

constructing a directed auxiliary graph from an undirected graph representing said network by reversing each link in said ~~a~~ primary QoS path of said undirected graph and replacing each other link in said undirected graph that is not a link in said primary QoS path by two directed links;

identifying a walk in said auxiliary directed graph, corresponding to a set of bridges in said network, that represents a restoration topology for said primary QoS path; and

decomposing said walk into ~~identifying~~ a set of bridges in said network such that each ~~at least one~~ link of said primary QoS path is protected by a bridge of said set of bridges and each bridge of said set of bridges protects a different portion of said primary QoS path, wherein a restoration path between said source and said destination includes a bridge from said set of bridges and links of said primary QoS path, said restoration path and said primary QoS path both satisfying QoS constraints.

9. (Currently Amended) The method as recited in Claim 8 further comprising assigning a zero cost to said each link and reducing ~~said walk identifier is configured to reduce~~ a cost of said walk.

10. (Currently Amended) The method as recited in Claim 8 wherein said identifying said walk comprises satisfying a delay constraint and employing a modified restricted shortest path algorithm to identify said walk.

11. (Currently Amended) The method as recited in Claim 8 wherein said identifying said walk comprises identifying multiple walks in said auxiliary directed graph, said multiple walks representing multiple restoration paths.

12. (Currently Amended) The method as recited in Claim 8 further comprising applying an adjusted delay to said walk to determine if said walk represents a feasible restoration topology

~~wherein said constructing comprises determining said primary QoS path~~.

13. (Currently Amended) The method as recited in Claim 8 wherein said identifying comprises combining ones of said bridges to form said ~~a~~ restoration topology.

14. (Currently Amended) The method as recited in Claim 12 ~~8~~ wherein said feasible restoration topology has a cost that is limited based on a minimum cost of said restoration topology ~~method is carried out in a network operations center of said network~~.

15. (Currently Amended) A method of provisioning restoration paths in a network, comprising:

constructing a graph representing said network and having nodes and links;

identifying a primary QoS path in said graph for normal network operation between a source node and destination node in said network, said primary QoS path satisfying both a bandwidth constraint and a delay constraint;

reversing all of said links that are in said primary QoS path and replacing each other link in said graph that is not a link in said primary QoS path by two directed links;

finding in said graph a lower cost walk having a set of bridges in said network, said walk satisfying ~~that satisfies~~ adjusted delay constraints; and

selecting a subset of bridges from said walk ~~in said network~~ such that each link of said primary QoS path is protected, said subset constituting one of said restoration paths with each of said restoration paths including a bridge from said subset of bridges and links of said primary QoS path, said restoration path and said primary QoS path both satisfying QoS constraints.

16. (Original) The method as recited in Claim 15 wherein a cost of said subset is a

minimum.

17. (Original) The method as recited in Claim 15 further comprising assigning a zero cost to said each link that originated from said primary QoS path and reducing a cost of said walk.

18. (Original) The method as recited in Claim 15 wherein said selecting comprises satisfying a delay constraint and employing a modified restricted shortest path algorithm.

19. (Currently Amended) The method as recited in Claim 15 wherein a value of an adjusted delay of a walk terminating at a node u_k in said network is based on if node u_{k-1} is a node of said primary QoS path ~~further comprising determining said primary QoS path~~.

20. (Original) The method as recited in Claim 15 further comprising combining ones of said bridges to form a restoration topology.

21. (Currently Amended) The method as recited in Claim 20 ~~15~~ wherein said restoration topology is an optimal restoration topology in which each link is shared by at most two bridges ~~method is carried out in a network operations center of said network~~.